LIKENESSES DIFFERENCES AND VARIATIONS OF PHONEMES
IN MEXICAN INDIAN LANGUAGES AND HOW TO FIND THEM

Por Kenneth L. Pike.

I.—WHAT IS THE PHONEME?

Every language has a certain number of sounds which it uses to build its words. This number is limited. This is like the notes of the musical scale, where a relatively small number of pitches may be used for the greatest compositions. In the same way a language is composed of a relatively small number of sounds, usually between fifteen to fifty. Each of these sounds in a given language may vary considerably and yet remain sufficiently close to the “parent” sound so that the ear thinks it hears the original and is entirely unconscious of the fact that it varies. The parent sound with its variations is called a phoneme. The “scale” of a language may be called its list of phonemes. Every different phoneme used by a language may (but does not necessarily) include several variations which the native ear overlooks and considers identical with the primary sound.

English has an “h” phoneme which has as many variations as there are vowels with which it occurs, since it is modified in its point of articulation by them, whether front of back, etc. The “k” phoneme varies in the same way, as may be seen in the varying articulation of the sound in the words—*key, cat, call*—, or the—*h*— in *hit, hat, hall*. Mexican Spanish has an interesting variation of the phonemes of final—*n*— In Mexico City it may usually be heard as an interdental, dental, or alveolar, but in Oaxaca it generally is a velar. For example word for *bread* may be heard either *pan* or *pang*. That which in English is divided into two phonemes, as in *win* vs. *wing* is in Mexican Spanish one.

II. METHODS FOR DIFFERENTIATING PHONEMES

If one wishes to ascertain whether a certain sound is a separate phoneme or merely a variation of phoneme, one should try to find words or a series of words where the meaning changes with the change of the sounds in question. This may be shown by the vowel phonemes of the English quite easily.

meat mit mate met mat moat mut moot
keep kit Kate cat (cot) cot coat cut coot
peat pit pate pet pat (pot) pot put put

The consonants may be shown similarly, but the following will be sufficient for the present: kit, mit, hit, sit, fit, knit, wit, lit. In this instance a whole series of phonemes changed the meaning of the word.
In the Mexican Indian languages it would be fine if the phonemes could be shown in series of words in this fashion, but due to the long words in them it is only an idealistic picture. Long words rather rule out the possibility of such a series if a language has many phonemes. The investigator can hope to find, however, pairs of words which will show the difference between phonemes which are of formation so similar, as to cause him, at first, difficulty in hearing the difference between them. One should always look for such pairs, such as may be found in the Totonaco of Zapotitlan de Mendez, hiciūc hot (of peppers), hicac hot (of sun) where the weakening of the —a—phoneme to a medial is used to show the difference of meaning in the cognate words.

Wherever such pairs of words may not be found, there is another method which can be used to find whether a sound is a separate phoneme or a variant of one. This consists of arranging a list of words wherein the sound or sounds in question are found in various positions, in these different positions their relation to other sounds varies. If on the chart two sounds are seen to occupy similar places, one may suspect that there are two different phonemes. Certain exceptions to this will be dealt with below. If one sound is found to occur in a certain limited number of places, such as after nasals, while the second sound is found in all or many places except in those places (e.g. in this instance, after nasals) the two may be considered to be one phoneme only. The limited use of the variant complements the sound as generally used. Such a list of possibilities will be presented. Probably no language will be able to use them all, and on the other hand some languages undoubtedly require more and finer distinctions than are here given.

Find examples of words in which the sound in question occurs in the following places:

1. In a syllable carrying the accent.
2. In a syllable preceding the one accented.
3. In a syllable following the one accented.
4. In a syllable which previously had accent but lost it in composition.
5. Beginning a syllable.
6. Ending a syllable.
7. Beginning a word.
8. Ending a word.
9. Preceding a voiceless stop.
10. Following a voiceless stop.
11. Between voiceless stops.
12. Preceding voiced stop.
13. Following a voiced stop.
15. Preceding a sibilent.
16. Following a sibilent.
17. Following a sibilent but before a vowel.
18. Before —w— or —h— and —y—.
19. After —w— or —h— and —y—.
20. Before, after or between liquids, —l—, —n—, —r—.
22. Following a nasal.
23. Following voiceless nasals.
24. Between nasals.
25. Before other voiced consonants.
26. After other voiced consonants.
27. Before other voiceless consonants.
28. After other voiceless consonants.
29. Before a front vowel.
30. Before a back vowel.
31. After a front vowel.
32. After a back vowel.
33. Between vowels.

Phonemic variations which are regular and are based upon the relation of one sound to others may be found by this method.

If the variations are not regular, but are used inconsistently, the above will not be of particular assistance. Inconsistent or unconditioned variations include, (1) those which one person may make in the same word even under the same circumstances; (2) the variations which may be found in the same words within a village, or (3) those which may be found within a single family. Examples of this can readily be found in Indian village, and the changing pronunciations are a constant source of orthographical difficulty at the earlier stage of investigation. The investigator should record all variations which he hears from time to time. Soon he will find that they are decidedly limited and must take place within a certain definite range of possible change. This range of insignificance (i.e. not substitution of phonemes) is by no means the same in all languages. One languages will have a wide range of variation and other languages will have a narrow one. The illustration previously given of Spanish bread being pronounced pan or pang, while horse being given cabayo or cabazo in another. Both are generally confined to certain sections of the country except for cases of contamination where the sounds may overlap each other’s territory. Another illustration is vamonos, (let us go) being pronounced bámonos. I have had three brothers in Mixteco see no difference in kití and giti. One used the firsts and the others the second.

The case of dialectical differences is in some respects similar to this problem of insignificant variations, but it will not be discussed here.

III. VARIATIONS WITHIN THE INDIVIDUAL PHONEME.

The chart given above if used for any language will soon show many insignificant variations. By insignificant we do not mean unimportant, but rather insignificant to the basic structure of the language in that they do not constitute separate phonemes.

These variations are due to many causes which we shall illustrate briefly.

1. Labialization: Since the majority of back vowels are rounded, a consonant preceding them is apt to partake of this lip rounding
through regressive assimilation. This may be seen in Mixteco sehe, son with spread lip, vs. suchi, child, where lip rounding occurs. This difference may be heard quite easily if one gives the sound —s— separately, first with rounded and then with unrounded lips. Certain African languages use this differences of labialization to make two —s— phonemes, as do the American Indian languages in the bilabials and velars, which will be mentioned again later.

2. Gemmination: The doubling of sounds between syllables where like consonants occur or where two similar consonants are made identical through assimilation, is sometimes found in American Indian languages. Many of them use open syllables only, a condition which makes gemmination of consonants difficult or impossible except in conjunction with syncope.

3. Velarization: The adding of a secondary and less important point of articulation at the velar is more apt to occur with the bilabials than any other sound and apart from this position is rare in the Mexican Indian languages.

4. Palatalization: Before —i— or —y— palatalization is very common. In Mixteco it affects all consonants and adds an aspirate to them. For example in luli, small, the two —l— sounds are different. The first is clear and resonant, the second quite husky and aspirated. Both are voiced and make a single phoneme. —k—, —g—, —t— may be affected in the same way, receiving a marked modification of articulation and slight aspiration before —i—.

5. Nasalization: Vowels before or after nasals frequently assimilate to nasal vowels. quihiyo is Mixteco we are going (inclusive). Frequently the words is given quió where by syncope the —y— drops out or is assimilated to the —i—, then the —o— is nasalized by progressive assimilation.

6. Changing accentuation: The shift of accent has a very important bearing upon the consonants of certain languages. The report on Tarahumara given by Prof. Nida included a great many such instances. tyópa to teopá shows the loss of the —y— and is caused by accentual shift.

7. Devocalization: Sounds may often be unvoiced and partially assimilated when near voiceless consonants. When sounds are final in a word unvoicing occurs frequently. A regular change of this nature may be seen in Cakchikel where final —l— is unvoiced but all other —l— sounds voiced. Totonaco has final —y— unvoiced and all others voiced.

Each of the seven processes mentioned may be referred to a specific part of the phoneme chart where they occur due to assimilatory or other features. Labialization should be looked for in connection with numbers 7, 19, 30, and 32; Gemmination 5, 6, 7, 8; Velarization 32, 33, and velar sounds: Palatalization 18, 19, 29, 31 (—i— and —y—); Nasalization 21, 23, 22, 24: Accentuation changes 1, 2, 3, 4: Devocalization 8, 9, 10, 11, 28, 30.

We shall give an illustration by the use of the chart. The English —p— is usually strongly aspirated. At times it is non —aspirate or only slightly so. The rules for the change are quite regular. To find
them fill out the chart given above for the sound —p.— The following is suggestive. For the aspirates: 1 pail, 2 prepare, 3 pepper, 4. approbation. 5. pair, 6. map, 7. pair, 8. map, 16. clasp, 20. play, prey, ramp, help, 23. clamp, 29. pick, 31. lip, 30. pool, 32. mop, 33. apart. With the unaspirates the following: 1. apt, 2. adaptation, 3. happy, 4. adaptation, 5. happy, 8. Phillip (ending with lips kept closed), 16. spy, 17. spy, 21. hypnotize, 20. spy, 30. spoon. Note several things. Unaccented syllables tend to aspirate the —p— less than other syllables. Compare dapper with percolate to see the change in —pr.— Test with the back of the hand or a piece of paper to show that the majority of English voiceless stops are aspirated. The exceptions are seen (1) in some unaccented syllables as mentioned (2) in double consonants where the voiceless stop precedes another, (3) oftentimes before vocalic —r— or medial —n—, and (4) most generally following a sibilent while at the same time preceding a vowel. When used before a back vowel the stop following the sibilent often has more aspiration than when before front vowels, (cf. spin and spoon.) The —p— has more aspiration under these circumstances than does —t— or —k— as may be seen in a similar list of words with those sounds. It is easy to test the differences with a lighted candle held close to the mouth. A strong aspiration will blow out the flame.

These variations mentioned appear insignificant to the English speaking person. In the same way there are marked and regular variations within the phonemes of Mexican Indian languages. Totonaco reverses the English rule and has all voiceless stops nonaspirate before vowels but aspirate before consonants. Mazateco has an interesting —n— phoneme wherein every final nasal or each nasal before a velar stop become velar nasals. By the chart given above these changes could easily be shown to constitute variations of single phonemes even though to the foreign ear they seem to be two sounds.

IV. PHONEMES WITHIN INDIAN LANGUAGES WHICH ARE SIMILAR ONE TO ANOTHER

The variations which may be seen in the processes of labialization etc., above may in many languages make separate phonemes.

The aspirate vs. nonaspirate stops must be distinguished in Mazateco, as was seen earlier in a preceding report this afternoon.

The same test for aspiration, feeling the breath on the back of the hand, a piece of paper, or a candle, may be used to show the difference in another class of sounds. The nasals may be voiced or voiceless. The voiceless have a marked aspiration through the nose which may be tested in that manner. Mazateco has these also.

The labialized consonants which make different phonemes from consonants without lip rounding may be tested by the use of a mirror. The amount which one rounds one’s lips should then be clearly seen. Many Indian languages have labialized velars. English can give an illustration with the words quit vs. quick, coat vs. quote. Here the —w— is a transitional consonant between the labialized velar and the following vowel. Often a bilabial —f— is distinguished
from a rounded bilabial voiceless —w—. The voiced —v— bilabial likewise may need to be distinguished from the rounded —w— voiced.

When two series of velars, front and back, need to be distinguished, one may practise for them by a mechanical control of the tongue. Take a pencil, hold the front of the tongue down with it so that when the back of the tongue rises the stop is made for ordinary —k—. Then thrust the pencil in farther to hold down all of the tongue but the part at the uvula. This should produce the velar —k—. Cf. Cakchiquel colonel, where the pencil meets the tongue about an inch back of the teeth, to the kolonel, where the pencil meets the tongue about two and a half inches behind the teeth. The back velar Cakchiquel fortis may be practised in the same way. Hold the tongue to the back position, then hold the breath and repeat ’k-k-k-k-k-
Since the breath is held the glottis is automatically kept closed. The closed glottis in conjunction with the stop is the principle feature of the fortis, so this should give the desired result.

The pencil can be used by non-Spanish students to learn the —ũ—. In this case just the extreme tip of the tongue should be kept down while the blade lifts up and makes contact with the inner ridge of the prepalatal arch. The sound often makes separate phoneme from dental —n— in Indian languages. Cf. Spanish una (one) vs. uña (fingernail). Say —unu—. Place the pencil in the mouth on top of the tongue so it cannot move forward, then spread the lips apart. The sound may be changed to medial —i— if the tongue is not kept quite so far back.

The nasal vowels which often cause difficulty are produced by the relaxation of the velum. That allows the sound to escape up behind the velum and out through the nose at the same time it does the mouth. Yawn several times. Take a mirror and watch the lifting of the velum to close the nasal passage while the yawn is in progress. Practice yawning until the velum can be voluntarily controlled. Then say the different vowels -a-e-i-o-u-. Relax the velum to make them nasal.

V. SUMMARY OF COMMON PHONEMES IN MEXICAN LANGUAGES

So far as I have had opportunity to study the phonetics of Mexican Indian languages they have three points in common. Each has a group of stops which are without aspiration before the vowel (this, does not apply to stops preceding consonants). Each has a series of dental consonants. Each has four or five pure long unglided vowels which form the basis for their chief vocalic sounds. Other characteries are common but not universal, as follows: a tendency to two series of voiceless stops (aspirate, nonaspirate, fortis, labialized, etc.), the voiced stops occupying a relatively unimportant place; the glottal stop frequent and occurring in various positions in the word; two series of velar consonants (front vs. back, labialized, fortis, etc.).

I hope that other investigators will cooperate in further attempt to list the features common to the Indian languages.